



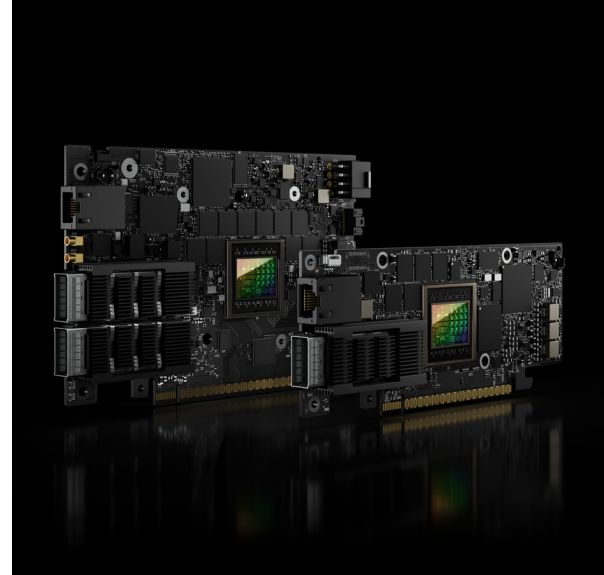
NVIDIA BlueField-3 Networking Platform

The 400 Gb/s infrastructure compute platform for powering the world's data centers.

The NVIDIA® BlueField®-3 networking platform is designed to accelerate data center infrastructure workloads and usher in the era of accelerated computing and AI. Supporting both Ethernet and InfiniBand connectivity, BlueField-3 offers speeds up to 400 gigabits per second (Gb/s). It combines powerful computing with software-defined hardware accelerators for networking, storage, and cybersecurity—all fully programmable through the NVIDIA DOCA™ software framework. Drawing on the platform's robust capabilities, BlueField data processing units (DPUs) and BlueField SuperNIC™ cards revolutionize traditional computing environments, transforming them into secure, high-performance, efficient, and sustainable data centers suitable for any workload at any scale.

The **BlueField-3 DPU** is a cloud infrastructure processor that empowers organizations to build software-defined, hardware-accelerated data centers from the cloud to the edge. BlueField-3 DPUs offload, accelerate, and isolate software-defined networking, storage, security, and management functions, significantly enhancing data center performance, efficiency, and security. By decoupling data center infrastructure from business applications, BlueField-3 creates a secure, zero-trust data center infrastructure, streamlines operations, and reduces the total cost of ownership.

The **BlueField-3 SuperNIC** is a novel class of network accelerator that's purpose-built for supercharging hyperscale AI workloads. Designed for network-intensive, massively parallel computing, the BlueField-3 SuperNIC provides best-in-class remote direct-memory access over converged Ethernet (RoCE) network connectivity between GPU servers at up to 400 Gb/s, optimizing peak AI workload efficiency. For modern AI clouds, the BlueField-3 SuperNIC enables secure multi-tenancy while ensuring deterministic performance and performance isolation between tenant jobs.



Portfolio

- > 1 or 2 ports with up to 400 Gb/s connectivity
- > 32 GB on-board DDR5 memory
- > Form factors: HHHL, FHHL
- > 1 GbE out-of-band
- > management port
- > Integrated BMC

Key Software-Defined, Hardware-Accelerated Applications



Cloud Networking

Cloud overlay, SDN acceleration, NAT, load balancer, NFV, video streaming



Storage

NVMe over Fabrics (NVMe-oF), NVMe/TCP, elastic storage, hyper-converged infrastructure (HCI)



Security

Distributed next-generation firewall, root of trust, micro-segmentation, DDOS prevention



HPC / AI

AI cloud, secure multi-tenancy, cloud-native supercomputing, communication acceleration



Telco and Edge

Cloud RAN, virtualized edge gateways, VNF acceleration, edge microservers

Features

Network and Host Interfaces

Network Interfaces

- > 1 or 2 ports with up to 400 Gb/s Ethernet or NDR InfiniBand connectivity

PCI Express Interface

- > 32 lanes of PCIe Gen 5.0
- > Flexible PCIe switch supporting self-hosting and server-hosting

Compute and Memory

Arm CPU Cores

- > Up to 16 Armv8.2+ A78 Hercules cores
- > 8 MB L2 cache
- > 16 MB LLC system cache

Programmable Datapath Accelerator

- > 16 cores, 256 threads
- > Programmability through DOCA
- > Heavy multi-threading application acceleration

DDR and SSD Support

- > Dual DDR5 5600 MT/s DRAM controllers
- > 32 GB on-board DDR5
- > ECC error protection support
- > 128 GB on-board SSD

Hardware Accelerations

Security

- > Platform security
 - Secure boot with hardware root-of-trust
 - Secure firmware update
 - Onboard flash encryption
 - Device attestation
- > Functional isolation layer
- > IPsec/TLS/MACSec 128/256-bit data-in-motion encryption
- > PSP security protocol (PSP)
- > AES-GCM 128/256-bit key
- > AES-XTS 256/512-bit data-at-rest encryption
- > Connection tracking for stateful firewall
- > Public key accelerator (PKA)
- > True random number generator (TRNG)

Storage

- > BlueField SNAP—Elastic block storage—NVMe and Virtio-blk
- > NVMe-oF and NVMe/TCP acceleration
- > Decompression engine
- > Erasure coding for RAID implementation

Networking

- > RoCE, Zero Touch RoCE
- > ASAP² Accelerated Switch & Packet Processing[®] for SDN and VNF acceleration
- > Single Root I/O Virtualization (SR-IOV)
- > VirtIO acceleration
- > Overlay network acceleration
 - VXLAN, GENEVE, NVGRE
- > Programmable flexible parser: user-defined classification
- > Connection tracking (L4 firewall)
- > Flow mirroring, sampling, and statistics
- > Programmable congestion control (PCC)
- > Stateless TCP offloads

HPC/AI Accelerations

- > HPC/AI All-to-All engine
- > NVIDIA GPUDirect[®]
- > NVIDIA GPUDirect Storage (GDS)
- > HPC MPI Tag Matching

Advanced Timing and Synchronization

- > IEEE 1588v2 (any profile)

- > PTP hardware clock (PHC)
- > Line-rate hardware timestamp
- > Time-triggered scheduling
- > Precise Time Measurement (PTM)
- > Time-based SDN acceleration

Boot Options

- > Secure boot (RSA authenticated)
- > Remote boot over Ethernet
- > Remote boot over iSCSI
- > PXE and UEFI

Management

- > Integrated BMC
- > 1 GbE out-of-band management port
- > NC-SI, MCTP over SMBus, and MCTP over PCIe
- > PLDM for Monitor and Control DSP0248
- > PLDM for Firmware Update DSP026
- > I2C interface for device control and configuration
- > SPI interface to flash
- > eMMC for storing the system's BIOS
- > UART debug interface
- > USB connector to load operating system images

Ready to Get Started?

For ordering information, please contact your NVIDIA sales representative or visit the [NVIDIA BlueField-3 User Guide](#)

To learn more about the NVIDIA BlueField Networking Platform, visit: www.nvidia.com/dpu

